

Distribution, Incidence, and Severity of Cherry Leafspot  
on the Allegheny National Forest

by  
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### Introduction

Leafspot of cherry, caused by the fungus Blumeriella jaapii (Rehm.) v. Arx (= Coccomyces sp), is a common disease that causes severe damage to black cherry (Prunus serotina Ehrh.) seedlings. The first visual symptoms on cherry foliage appear as a small purplish spots on the upper leaf surface that grow and later turn brown. The centers of these areas may drop out leaving a "shot-hole" appearance.

The fungus over winters on fallen leaves. Primary infection occurs in the spring during wet conditions as ascospores are discharged and then disseminated via wind currents onto susceptible leaves. Rapid secondary cycles can occur in early summer, and are characterized by whitish spore pustules (conidia) that appear within the lesioned areas during wet or humid weather. The conidia are water disseminated and can easily cause new infections throughout the summer. Severely infected leaves may become chlorotic and drop off. Ornamental trees have been reported to become weakened by the repeated foliage infections and then predisposed to winter kill (Bingaman, 1981).

The Allegheny National Forest (ANF) supplies nearly all the world's black cherry timber and the revenue gained from the trees contributes significantly to the local economy. Black cherry suffers from few pest problems, but advanced regeneration can sometimes be difficult to obtain. Any possible limiting factor, such as cherry leafspot, on regeneration survival is of concern, and therefore, warrant investigation.

The objectives of this evaluation are:

- (1) to determine the distribution and incidence of cherry leafspot on regeneration on the ANF.
- (2) to determine the severity of cherry leafspot infection on regeneration.

The survey will be conducted in June and September of two consecutive years, and will include all four Ranger Districts in the Allegheny National Forest. A total of 12 stands will be surveyed (3 stands per district) of which 1 is a shelterwood stand, 1 a commercially thinned stand, and 1 a no cut stand. All stands have been herbicided within the last 5 years to remove competing vegetation.

In June, a stand examination and analysis will be done using the guidelines established by Marquis et al. (1984). This procedure describes the number of seedlings required per 6' radius plot to adequately regenerate Allegheny Hardwood stands.

Stand maps will be used to establish cruise lines prior to surveying. The appropriate number of overstory plots corresponding to stand size will be systematically distributed over the entire acreage. A wooden stake will be used to mark the plot center from which a 10 BAF prism will be used to identify which trees are to be tallied. For each tree (greater than 1" DBH), species, DBH to the nearest 2" class, and quality class will be recorded,

Regeneration plots will be located at the center of each overstory plot and at half the distance to the next overstory plot. All regeneration will be tallied by species. This surveyed will provide information on the number of fully stocked plots per stand.

Also, plots having black cherry seedlings exhibiting symptoms of cherry leafspot will be counted as positive for the disease. This will allow a quick estimate of the distribution of infection in each stand. Leaf sample will be collected and placed in a growth chamber for identification and familiarization with the spores.

In September, a subsample of fully stocked and non-fully stocked plots in each stand will be surveyed for disease incidence and severity. The number of subsampling plots in each stand will be determined after the regeneration counts and analysis in June.

#### Incidence

Four mil-acre plots (3.7 foot radius) will be located 10 ft. from the center of the 6 ft. radius subsample plot in cardinal directions. A center plot will not be included due to prior trampling of seedling during the sine tally. The number of black cherry seedlings per mil-acre plot will be counted (dot tally). If there is a large number of black cherry seedlings, then seedling numbers will be estimated by 10 count.

Next, the number of black cherry seedlings that have leaf

spot will be counted. This will give the incidence of disease for

each plot, stand, district, and stand type.

#### Severity

The severity of the foliage symptoms will also be rated collectively in the 4 mil-acre plots. To standardize, only the top 6" of each seedling will be used in the severity evaluation. Ratings of total leaf surface infection will be estimated visually into one of four classes: Absent, Low (<10%), Moderate (10-50%), and High (>50%) (Stanosz 1990). For visual calibration of leaf surface area affected, leafspot severity standards (see appendix) were created using the ForestHealth Expert System which has been developed by the Pennsylvania State University in cooperation with the US Forest Service (Nash al.et. 1991).

Within each mil-acre plot, 5 individual black cherry stems will be randomly chosen, tagged, and an azimuth and distance recorded for each stem so that identification in 1992 will be accurate. Of these five stems, foliage will be visually combined, and severity estimated to the nearest 5% for each individual stem. Seedling mortality will also be recorded.

#### Analysis

In August 1991, the number of fully stocked plots will be determined using SILVAH (version 4.0), a computer based data summary program. The percentage of fully stocked regeneration plots in the shelterwood, thinning, and no harvest cuts will be compared and used in determining the number of plots in the incidence and severity study.

An analysis of variance (ANOVA) will be used to determine whether or not significant differences in incidence occur between stands and among districts. Severity frequencies will be compared between plots (stocking levels), stands, districts and stand types.

#### Equipment

Wooden stakes	Compartment maps	Data sheets	Hardhats
10 BAF Prism	Meteric Ruler	Compass	100 ft tape
Plastic Tags	Rubber Mallet	First-aid kit	Pencils

#### Cost

Table 1. Estimated annual cost the conduct the study.

Item	1991	1992
Weeks	8	8
Salary Temp	\$1600	\$1600
Travel Permanent	800	800
Equipment	100	0
Total	\$2500	\$2400

#### References

Bingaman, D.B. 1981. Leaf Spot of Cherry. Plant Path. Circular No. 28, Vol. 7, No. 2. Pa Department of Agric., Bur. of Plant Ind.

Marquis, D.A., Richard, L.E., and Stout, S.L. 1984. Prescribing Silvicultural Treatments in Hardwood Stands of the Alleghenies. Gen. Technical RPT. NE-96. USDA For. Service, NE For. Expt. Sta., Broomall, PA. 90pp.

Nash, B.L., Suanders, M.C., Skelly, J.J., and Davis, D.D. 1991. Development of an Expert System. A Final Report submitted to the National Vegetation Survey Forest Response Program, USDA Forest Service, Budget period: May 1, 1989 - December 31, 1990.

Stanozs, G. 1990. Relationships among forest litter burning, seedling density, and black cherry leafspot severity in northern Pennsylvania. Phytopath. 80(10): 991.

## Appendix

## List of Data Descriptions

### OVERSTORY PLOTS (odd # plots)

#### District:

- 1 - Bradford
- 2 - Sheffield
- 3 - Ridgeway
- 4 - Marienville

#### Cover type: 1 - forest

2 - forest/seedling

dbh: record to the nearest 2" class

#### Quality class: (see descriptions in SILVAH manual)

- 1 - Acceptable growing stock
- 2 - Unacceptable growing stock
- 3 - Unacceptable growing stock
- 4 - Cull

Species: see codes on the following page

#### Stand Type: 0 - no cut

131 - shelterwood

220 - commercial thinning

### UNDERSTORY PLOTS (regeneration tally)

follow procedures described in SILVAH manual